AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1-21. (Previously Cancelled)

22. (Previously Presented) An apparatus, comprising:

a settling chamber having a top section and bottom section;

an outlet port positioned on the top section; and

an inlet port positioned on the bottom section; wherein a ratio of height to width of the settling chamber is greater than 0.7.

23. (Previously Presented) The apparatus of claim 22, wherein the ratio of height to width of the settling chamber is greater than 1.2.

24. (Previously Presented) The apparatus of claim 22, wherein the bottom section comprises:

a base; and

an inlet port connected to the sidewall; and

the ratio of the size of the base to the size of the inlet port is approximately 4 to 1.

25. (Previously Presented) The apparatus of claim 24, wherein the inlet port is located approximately one half the inlet port size (diameter) higher than the base.

26. (Previously Presented) The apparatus of claim 24, wherein the base is circular.

27. (Previously Presented) The apparatus of claim 24, wherein the sidewall is cylindrical.

28. (Previously Presented) The apparatus of claim 22, wherein the inlet port is generally circular and a central axis of the inlet port is perpendicular to a central axis of the sidewall.

29. (Previously Presented) The apparatus of claim 27, wherein the inlet port is generally circular and a ratio of a diameter of the sidewall to a diameter of the inlet port is 4 to 1.

30. (Previously Presented) The apparatus of claim 22, wherein the inlet port is generally circular and a ratio of the height of the settling chamber to a diameter of the inlet port is greater than 2.8.

31. (Previously Presented) The apparatus of claim 30, wherein the ratio of the height of the settling chamber to the diameter of the inlet port is greater than 4.8.

32. (Previously Presented) The apparatus of claim 22, wherein the inlet port and the outlet port are generally circular and a ratio of the diameter of the inlet port to a diameter of the outlet port is 3 to 1.

33. (Previously Presented) The apparatus of claim 22, wherein the top section has a frustoconical shape.

34. (Previously Presented) The apparatus of claim 33, wherein the top section has a cone angle of 90 degrees.

35. (Previously Presented) The apparatus of claim 33, wherein the outlet port is located at a top portion of the frustoconical shape.

36. (Previously Presented) The apparatus of claim 22, wherein the apparatus is constructed of stainless steel.

37. (Previously Presented) The apparatus of claim 22, wherein the inlet port is welded to the settling chamber.

38. (Currently Amended) A method of using a ~~the~~ settling chamber ~~of claim 22~~, comprising:

providing the settling chamber with a top section and a bottom section, an outlet port positioned on the top section, and an inlet port positioned on the bottom section, wherein a ratio of height to width of the settling chamber is greater than 0.7;

introducing a gas fluidized particle stream through the inlet port at a given volume flow rate;

establishing a gas stream flow pattern within the settling chamber that retards transportation of one group of particles to the outlet port and facilitates transportation of another group of particles to the outlet port; and

collecting the other size of particles at the outlet port.

39. (Previously Presented) The method of claim 38, wherein the one group of particles has particles less than 10 microns and the other group of particles has particles greater than 10 microns.

40. (Previously Presented) The method of claim 38, wherein the step of establishing comprises:

establishing a main recirculating flow pattern in the bottom section; and

establishing a secondary recirculating flow pattern in the top section.

41. (Previously Presented) The method of claim 40, further comprising:

creating an interface between the main recirculating flow pattern and the secondary recirculating flow pattern.

42. (Previously Presented) The method of claim 38, wherein the step of establishing comprises:

establishing a main recirculating flow pattern in the bottom section; and

establishing a secondary, sympathetic recirculation flow pattern in the top section,

where the axes of rotation of both recirculating flow patterns are primarily horizontal and substantially perpendicular to the inlet stream.

43. (Previously Presented) The method of claim 38, wherein the step of introducing comprises:

radial introduction of the gas fluidized particle stream into the settling chamber.

44. (Previously Presented) The method of claim 38, wherein the step of introducing comprises:

introducing the gas fluidized particle stream at a given volume flow rate of 10-1000 scfm.

45. (Previously Presented) The method of claim 44, wherein the step of introducing comprises:

introducing the gas fluidized particle stream at a given volume flow rate of 100-200 scfm.

46. (Previously Presented) The method of claim 38, wherein the step of introducing comprises:

introducing a gas fluidized particle stream comprising one of metal oxide nanoparticles, metal nanopowders, metal nitride, mixed metal oxides, metal carbides and metal sulfide nanoparticles.

47. (Previously Presented) The method of claim 38, wherein the step of introducing comprises:

introducing a gas fluidized particle stream comprising particles having a minimum particle size of approximately .001 micron.

48. (Previously Presented) The method of claim 38, wherein the step of introducing comprises:

introducing a gas fluidized particle stream comprising free particles.

49. (Previously Presented) The method of claim 38, wherein the step of introducing comprises:

introducing a gas fluidized particle stream comprising particle clusters.

50. (Previously Presented) The method of claim 38, wherein the step of introducing comprises introducing a gas fluidized particle stream comprising free particles and particle clusters.

51. (Previously Presented) The method of claim 38, further comprising:

selecting the bottom section to be cylindrical.

52. (Previously Presented) The method of claim 51, further comprising:

selecting a diameter of the bottom section to be 48 inches.

53. (Previously Presented) The method of claim 52, wherein the step of introducing comprises:

introducing a gas fluidized particle stream at a volume flow rate of at least 10 scfm.

54. (Previously Presented) The method of claim 52, wherein the step of introducing comprises:

introducing a gas fluidized particle stream at a volume flow rate no greater than 1000 scfm.

55. (Previously Presented) A system, comprising:

means for introducing a gas fluidized particle stream into a settling chamber;

means for establishing a gas stream flow pattern within the settling chamber that retards transportation of one group of particles to an outlet port and facilitates transportation of another group of particles to the outlet port.

56. (Previously Presented) The system of claim 55, wherein the one group of particles consists of particles having a size less than 10 microns and the other group of particles consists of particles having a size greater than 10 microns.

57. (Previously Presented) The system of claim 55, wherein the means for establishing comprises:

means for establishing a main recirculating flow pattern; and

means for establishing a secondary recirculating flow pattern.

58. (Previously Presented) The system of claim 57, further comprising:

means for creating an interface between the main recirculating flow pattern and the secondary recirculating flow pattern.

59. (Previously Presented) The system of claim 55 , further comprising:

a means for establishing a main recirculating flow pattern; and

a means for establishing a secondary, sympathetic recirculation flow pattern, where the axes of rotation of both recirculating flow patterns are primarily horizontal and substantially perpendicular to the inlet stream.

60. (Previously Presented) The system of claim 55, further comprising:

radial introduction of the gas fluidized particle stream into the settling chamber.

61. (Previously Presented) The system of claim 55, wherein the means for introducing comprises:

means for introducing the gas fluidized particle stream at a given volume flow rate of 10-1000 scfm.

62. (Previously Presented) The system of claim 61, wherein the means for introducing comprises:

means for introducing the gas fluidized particle stream at a given volume flow rate of 100-200 scfm.

63. (Previously Presented) The system of claim 55, wherein the means for introducing comprises:

means for introducing a gas fluidized particle stream comprising one of metal oxide nanoparticles, metal nanopowders, metal nitride, mixed metal oxides, metal carbides and metal sulfide nanoparticles.

64. (Previously Presented) The system of claim 55, wherein the means for introducing comprises:

means for introducing a gas fluidized particle stream comprising particles having a minimum particle size of approximately .001 micron.

65. (Previously Presented) The system of claim 55, wherein the means for introducing comprises:

means for introducing a gas fluidized particle stream comprising free particles.

66. (Previously Presented) The system of claim 55, wherein the means for introducing comprises:

means for introducing a gas fluidized particle stream comprising particle clusters.

67. (Previously Presented) The system of claim 55, wherein the means for introducing comprises introducing a gas fluidized particle stream comprising free particles and particle clusters.